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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,389	12/29/2003	Mineo Yamakawa	043395-0378243	8159
86175 7590 12/08/2009 Pillsbury Winthrop Shaw Pittman LLP (INTEL) P.O. Box 10500 McLean, VA 22102				
EXAMINER				
WRIGHT, PATRICIA KATHRYN				
ART UNIT		PAPER NUMBER		
1797				
NOTIFICATION DATE		DELIVERY MODE		
12/08/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket\_ip@pillsburylaw.com

# Office Action Summary

**Application No.**

10/748,389

**Applicant(s)**

YAMAKAWA ET AL.

**Examiner**

P. Kathryn Wright

**Art Unit**

1797

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 10-17, 19-22, 31-40, 64-66 and 68-73 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 10-17, 19-22, 31-40, 64-66 and 68-73 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 13, 2009 has been entered.

### ***Status of the Claims***

2. This action is in response to papers filed October, 13 2009 in which claims 1, 11-14, 22, 32-35, 38, 65-66, 68-69 were amended, claims 18, 58-60, 63, 67 were cancelled, and claims 70-73 were added.

The amendments have been thoroughly reviewed and entered. Any objection/rejection not repeated herein has been withdrawn. Applicant's arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections, and new grounds for rejection. New grounds for rejection, necessitated by the amendments, are discussed.

Claims 1, 10-17, 19-22, 31-40, 64-66, and 68-73 are under prosecution.

### ***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the recitation that the upper substrate comprises a first cavity and the lower substrate member a second cavity wherein the porous silicon

membrane is located in a hollow space formed by the first and second cavities does not find antecedent basis in the original specification. However, the original specification does support a recess 124 formed in either the upper or lower substrate member (see paragraphs [0027] and [0037]).

The rules of the PTO require that application claims must “conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.” 37 CFR 1.75(d)(1).

As Applicant appreciates, the terminology of the original claims follows the nomenclature of the specification, but sometimes in amending the claims or in adding new claims, new terms are introduced that do not appear in the specification. **The use of a confusing variety of terms for the same thing should not be permitted.** New claims and amendments to the claims already in the application should be scrutinized not only for new matter but also for **new terminology**. While an applicant is not limited to the nomenclature used in the application as filed, he or she should make appropriate amendment of the specification whenever this nomenclature is departed from by amendment of the claims so as to have **clear support or antecedent basis in the specification for the new terms appearing in the claims**. This is necessary in order to insure certainty in construing the claims in the light of the specification. See 37 CFR 1.75, MPEP §608.01(i) and § 1302.01. Note that examiners are to ensure that the terms and phrases used in claims presented late in prosecution of the application find

clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description, see 37 CFR 1.75(d)(1).

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 10-17, 19-22, 31-40, 64-66, and 68-73 are rejected under 35

U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 22, 68 and 69 now recite that "the porous silicon membrane produces a change in both an optical characteristic and an electrical characteristic of the porous silicon membrane and wherein the porous silicon membrane is a sensor exhibiting sensing characteristics causing a change in at least one of the optical characteristic and the electrical characteristic in response to exposure to a targeted fluid or reaction." This does not appear to find support in the original specification. Nor has Applicant cited where in the specification this new limitation finds support. This is considered new matter.

However, the original specification does disclose at paragraph [0039]:

"[v]arious embodiments the porous membrane 110, 210 may be manufactured such that it may be used as a sensor in addition to its

filtering/sieving/separation/trapping capability. For example, the porous membrane may be manufactured to produce a changed optical and/or electrical characteristic in response to being exposed to a targeted fluid or reaction, either through use of the base substrate material (e.g., PSI or PPSi), or through the addition of a sensor layer or through chemical doping and the like. Generally, such PSI or PPSi sensor mechanisms may include but are not limited to optical interferometric reflectivity, capacitance modulation, photoluminescence, optical form birefringence, acoustic, etc."

Thus, it appears the porous silicon membrane is configured to produce a change in both an optical and electrical characteristic.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 1, 10-17, 19-22, 31-40, 64-66, and 68-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al., (US Patent Pub. No. 2003/0104512), hereinafter "Freeman".

As to independent claims 1, 22, 68 and 69, Freeman teaches a microfluidic device (see paragraph [0001]), comprising:

a source fluid flow channel (reads on upward extending well 16 in communication with channels 110 or 111), see paragraph [0044];

a target fluid flow channel 28 in fluid communication with the source fluid flow channel 13 at a cross-channel area, wherein the source fluid flow channel crossing over the target fluid flow channel in an "X" fashion at the cross-channel area (at the porous membrane), see embodiment of Fig. 5 and paragraph [0045];

a porous membrane 14 separating the source fluid flow channel from the target fluid flow channel in the cross-channel area, wherein the porous membrane comprises a porous silicon membrane (see paragraph [0029]);

a substrate comprising an upper substrate member 20 and a lower substrate member 10; and

a field-force/gradient mechanism (electrodes 26, 34) proximate the porous silicon membrane, wherein the field-force/gradient mechanism comprises an electric field configured to produce a fluid movement of a fluid from the source fluid flow channel to the target fluid flow channel via the porous silicon membrane located in the cross-channel area.

It is noted that Applicant teaches the use of porous polysilicon membrane (e.g., PPSi), see the original claims and paragraph [0039] of Applicant's specification. Thus, the porous polysilicon membrane of Freeman is a sensor that does necessarily exhibit a sensing characteristic causing a change in at least one of the optical characteristic and the electrical characteristic in response to exposure to a targeted fluid or reaction, since the membrane structure recited in the Freeman reference is identical to that of the claims, claimed properties or functions are presumed to be inherent. See . MPEP 2112.02.

Freeman teaches the source fluid flow channel is within the upper substrate 20 member and the target fluid flow channel is within the lower substrate member 10 and the porous silicon membrane is an integral part of the substrate. Freeman also teaches a substrate having recesses 140 for holding a plurality of membranes, see Fig. 6 and paragraph [0050].

Freeman does not specifically teach the upper substrate member comprising a first cavity and the lower substrate member a second cavity, and wherein porous silicon membrane is located in a hollow space (i.e., recess) formed by the first and second cavities. However, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form a cavity in both the first and second substrate of

Freeman so that the membrane is located therein since the recess created would help hold the porous silicon membrane in place for subsequent handling and prevent wrinkling or deforming of the membrane during use.

Regarding claims 10 and 31, Freeman teaches fluorescence spectroscopy and imaging (a light source 166 and a detector 170) focused at the membrane cross-channel area (see paragraph [0052]).

As to claims 11 and 32, Freeman teaches the thickness of the porous silicon membrane is between 0.01 and 50 micrometers (i.e., 4 to 20 microns), see paragraph [0029].

With respect to claims 12 and 33, Freeman teaches the porous silicon membrane is capable of fractionating molecules based on size, molecular weight, charges, chemical affinity or other chemical/physical properties (see for example paragraph [0041]).

As to claims 13 and 34, Freeman teaches the porous silicon membrane is made of a single crystal porous silicon (Psi), see paragraph [0029].

Regarding claims 14 and 35, Freeman teaches wherein the porous silicon membrane is made of a porous polysilicon (PPSi), see paragraph [0029].

With respect to claim 15, Freeman teaches the source fluid flow channel and the target fluid flow channel being formed in the substrate, see Fig. 1.

As to claims 16, 17, 36 and 37, Freeman teaches the substrates 20, 10 are made of polydimethyl siloxane (PDMS), silicon, quartz, etc., see paragraph [0050] and [0052].

With respect to claims 65, 66, and 70-73, as discussed above, Freeman teaches the membrane consists of porous polysilicon membrane 14 (see paragraph [0029]). It is

noted that Applicant teaches the use of porous polysilicon membrane (e.g., PPSi), see paragraph [0039] of Applicant's specification. Thus, the porous polysilicon membrane of Freeman does necessarily exhibit the property of being a passive diffusion barrier between the source fluid flow channel and the target fluid flow channel, since the membrane structure recited in the Freeman reference is identical to that of the claims, claimed properties or functions are presumed to be inherent. See . MPEP 2112.02.

As to claims 19, 20, 39 and 40, please note that a recitation with respect to the manner in which a claimed apparatus is intended to be employed, (i.e., disposed or reused) fails to differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim. Freeman inherently teaches the device is a disposable or reusable since any device can be disposed of or reused.

As to claims 21 and 64, Freeman teaches wherein the source fluid flow channel and the target fluid flow channel intersect at a 90 degree angle at the cross-channel area, see embodiment of Fig. 5.

### ***Double Patenting***

10. The provisional rejection of claims 13-14 and 34-35 on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 38-39 and 41 of copending Application No.10/856,372 is held in abeyance until indication of allowance of the claims.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection, as set forth above.

***Conclusion***

12. No claims are allowed.
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to P. Kathryn Wright whose telephone number is (571)272-2374. The examiner can normally be reached on Monday thru Thursday, 9 AM to 6 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. Kathryn Wright/  
Examiner, Art Unit 1797